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ADVANCED TECHNOLOGY PARTNERSHIP OFFERS CREATIVE LEARNING TO STUDENT LINE MECHANICS

Advanced technology partnership offers creative learning to student line mechanics

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Creatively packaged learning tools are changing the training process for utilities. Des Moines-based MidAmerican Energy learned this firsthand when it partnered with augmented reality provider Index AR Solutions to produce training programs, including an e-book and associated apps for electric utility technology training.

That technology can now reach an even wider audience through an agreement that allows Des Moines Area Community College (DMACC) students free access to the MidAmerican program during training courses. This collaboration between a utility, a technology company, and an educational institution opens new and exciting doors for all three.

Implementation and growth of the community college program

One of the initial questions for [DMACC](#) about accepting [MidAmerican](#) content revolved around the cost to the college.

“We are a community college with the lowest tuition in the state. So we try not to push any expenses onto students that we don’t have to,” explained Jenny Foster, Executive Academic Dean at DMACC.



The college was able to meet that goal through an agreement with [IndexAR](#) for free curriculum for the first year and the donation of iPads, which serve the delivery of curriculum to students and instructors. DMACC's program, now in its second year, has grown from about 10 participants to 30, and IndexAR continues to provide the curriculum and iPads for free.

Des Moines Area Community College students and faculty participated in weekly meetings with IndexAR to review the curriculum material, and IndexAR used this feedback to improve curriculum and functionality.

As a partner, MidAmerican Energy also benefits from the program, as DMACC students who go through the curriculum are trained to MidAmerican standards. That's because the utility helped design the college's certificate and degree program.

"As we built those e-books and we built those applications, we noticed that the value was very good, and we could share it," explained Stephen Simmons, MidAmerican's Director of Trades and Crafts Training. "We needed a way to get more people into the introductory portions of line work. We worked with DMACC and Index to develop a college program that leads to a one-year certificate or two-year diploma."

This innovative program is helping to offset challenges that the energy industry faces in introducing a younger workforce to field work. Workers with fewer than 10 years of experience now make up 60% of the line worker population, according to the [Center for Energy 2023 Energy Workforce Survey Results summary](#).

The summary's outlook on this issue, however, was largely positive in light of programs like the one used at DMACC.

"Efforts the industry has undertaken related to energy education pathways in high schools, community colleges, and universities appear to have had an impact on increasing the talent pool for these high-skill positions," the summary said.



MidAmerican's buy-in to capture knowledge

A key part of the process in MidAmerican's collaboration with Virginia-based Index AR, according to MidAmerican's Simmons, has been getting buy-in from company stakeholders to capture knowledge in the field "that a lot of times will just walk out the door without being able to be realized."

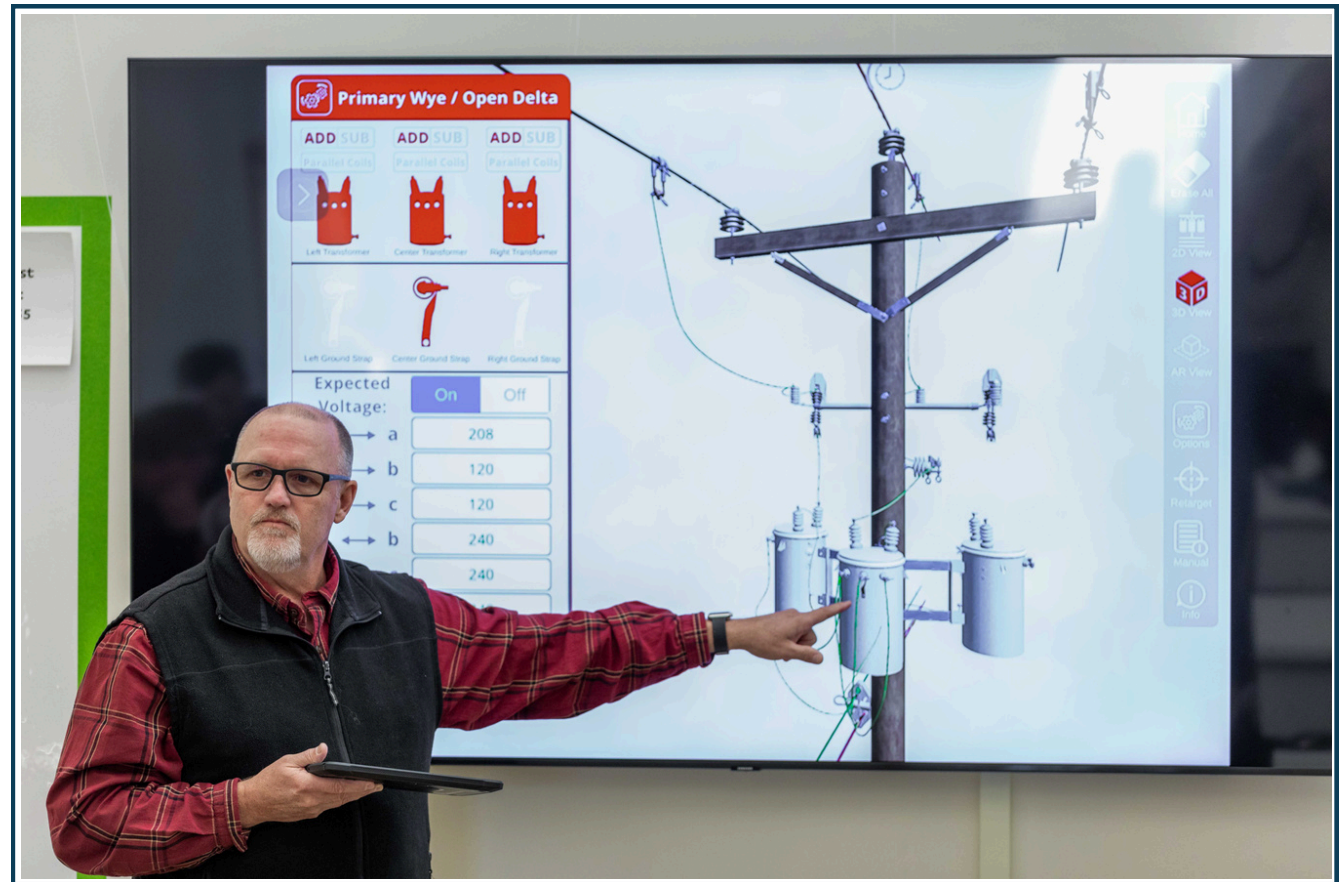
It's been important to expand the knowledge pool beyond corporate leadership, he said, especially with retirements and a younger workforce. Simmons said that Index AR's ability to work with diverse groups has contributed to that inclusion.

"Everybody is in our e-books, from the president of the company to the brand-new apprentice who is learning out in the field," he said. "They all have a part to play."

E-books offer personalized, multi-format learning

Electronic books, accessible via iPad library, allow for nimble navigation via swiping and aggregated page viewing capabilities.

Users can zoom in on media content, which IndexAR curates through on-site photography of system components like electrical substations. The text contains interactive features such as glossary terms underlined in blue.



Clicking on these terms reveals a definition window in which a glossary index button lets users access all the glossary terms in an e-book. Index AR's in-house graphics team breaks down complex ideas for readers using components like sine-wave graphs, and users can make e-books their own by highlighting passages, adding notes, and bookmarking pages.

Videos are also embedded throughout the e-books. These include employees wearing all proper safety gear and personal protective equipment, so readers can see that the details are accurate. Integrated human improvement tools allow users to update their own safety and proper procedure knowledge, and knowledge checks at the end of each chapter and e-book give students instant feedback on questions they answer digitally.



Applications simulate real-life situations

Within the apps, 3D representations of equipment allow users to tap for the definition and purpose of each component. Interior views provide users with perspective they might not get in real life.

“They don’t have access to these pieces of equipment to take apart or look inside. Usually they’re very damaged if you’re able to look inside,” explained Zach Korkowski, IndexAR’s Senior Manager of Projects and Client Development. “To be honest, these pieces of equipment are so expensive that they’re not just going to take a good one and take it apart for training purposes.”

The 3D option allows users to see the full assembly and rotate a piece of equipment to see the internal workings. An toggle allows users to scan a flat surface and place an AR model on it to rotate.

Lessons like substation safety awareness take students beyond individual structures to models of entire sites, such as electrical substations, in which they can access information like approach distance guidelines for different states, current safety practices, and technical component descriptions. A print reading app breaks down complex renderings like engineering one-line diagrams with text descriptions of diagram components and how they work.

Theory-based lessons like the transformer trainer app, Korkowski said, portray concepts like electromagnetic fields, which would be “impossible to see in the real world,” using animated models, text, and descriptive audio. In this app, users can simulate the building of wiring configurations for transformers in 2D and 3D and AR formats, and get real-time feedback on correct configuration and safety procedure. It’s a sharp deviation, Korkowski said, from the paper-and-pencil format some utilities use for trainees, and it can enhance safety for eventual in-the-field work.

“If you do it incorrectly in the field and power is then reconnected to this equipment, that could be very dangerous,” he said. “They can work though this in a controlled setting where they can get it wrong as many times as they need to until they’re comfortable getting it right and they really understand the equipment.”



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Company Profile

Des Moines Area Community College opened in 1966 to serve vocational and technical learners. Today, it's the largest community college in Iowa with 13 locations and a service district of 6,560 square miles.

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Company Profile

MidAmerican Energy, a Berkshire Hathaway Energy subsidiary, is a natural gas and electric service provider. Its 29,000 miles of power lines and 13,000 miles of natural gas systems serve customers in Illinois, Iowa and South Dakota. The company also has natural gas customers in Nebraska.

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Company Profile

Founded in 2015, Williamsburg, Virginia-based IndexAR provides custom and off-the-shelf e-book and augmented reality products that allow for greater safety, capability, and productivity across industries from utilities and mining to healthcare and airlines.

Comarketing efforts and future uses

For companies with whom IndexAR partners, comarketing agreements can offset the cost of products over time. And sharing agreements can also significantly shorten production time as new clients' information can be inserted into existing products and templates.

DMACC's Foster praised MidAmerican for its willingness to share a costly investment with her students for free.

"MidAmerican has been a super partner," she said. "They invested a lot of money for IndexAR to create the curriculum, and then gave them permission to share all of that with us. That was something they didn't have to do."

DMACC President Rob Denson said the college plans to continue using the electric utility technology training program, and it's looking at other areas where programs that provide advanced exposure could be beneficial.

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